

TABLES

TABLE 4-1
SEDIMENT METALS RESULTS
COLUMBIA RIVER NEAR BRADFORD ISLAND

Sample ID	010503SBDS19SS	010503SBDS18SS	010502IW07SS	010502IW01SS	010502IW16SS	010502IW14SS	010502IW15SS	BF-BC-17	BF-BC-26	Background Sediment		Background Sediment
Area	Drain outfall	Drain outfall	Pile #1	Pile #2	Pile #2	Pile #2	Pile #2	Background	Background	Values		Values
Location	Outfall #1	Outfall #2	Perimeter	East Perimeter	West Perimeter	Within Pile	Duplicate of 14SS	Upstream of Goose Island	Upstream of Goose Island	LCR Rec		DEQ
Date Collected	5/3/01	5/3/01	5/2/01	5/2/01	5/3/01	5/3/01	5/3/01	7/18/02	7/18/02	Range	Average	Freshwater Sediment
Aluminum mg/kg-dry	6200	11000	12000	12000	9500	11000	13000	11900	9500	2794-10850	7079	NV
Antimony mg/kg-dry	0.97 U	0.92 U	0.72 U	0.62 U	0.7 U	0.7 U	0.73 U	0.806	0.342	4.32-6.78	5.19	1
Arsenic mg/kg-dry	7	7.4	2.4	4.3	4.3	2.4	2.7	5.51	5.77	0.6-4.1	2.46	7.9
Barium mg/kg-dry	50	89	74	95	83	88	95	153	199	28.2-164.5	96.66	NV
Beryllium mg/kg-dry	0.086 J	0.24	0.24	0.23	0.21	0.27	0.3	0.482	0.373	2.82-4.64	3.52	NV
Cadmium mg/kg-dry	1.3	1.1	0.62	0.73	0.7	1	1	0.52	0.0649	0.11-1.44	0.44	<0.5
Calcium mg/kg-dry	4200	6100	7000	4400	5100	4200	6000	5510	6500	NV	NV	NV
Chromium mg/kg-dry	980 J	74 J	18	17	20	16	22	21.5	15.7	2.4-9.95	7.41	30
Cobalt mg/kg-dry	25	12	17	9.6	12	8.6	13	12.4	14.5	NV	NV	NV
Copper mg/kg-dry	40	110	50	27	32	27	37	28.3	33.7	3.8-17.83	9.21	12
Iron mg/kg-dry	32000	26000	30000	21000	25000	18000	24000	26100	25200	8861-17742	12,342	NV
Lead mg/kg-dry	130 J	230 J	6.2	7.9	12	9.3	9	16.3	8.85	1.41-13.24	7.92	2
Magnesium mg/kg-dry	33000	6300	12000	6000	6500	4600	8200	5170	6980	NV	NV	NV
Manganese mg/kg-dry	770 J	460 J	380	340	470	380	600	716	499	NV	NV	NV
Mercury mg/kg-dry	0.021 J	0.022 U	0.051 J	0.065 J	0.017 J	0.035 J	0.025 UJ	0.188	0.0498	0.058-0.107	0.07	0.2
Nickel mg/kg-dry	630	26	22	8.5	11	7.6	11	19.1	18.7	4.21-14.19	10.55	20
Selenium mg/kg-dry	340 J	1000	0.31 J	0.26 J	0.2 J	0.7 U	0.73 U	5.67 U	3.61 U	0.29-0.90	0.39	0.4
Silver mg/kg-dry	0.19 J	0.77 U	0.11 J	0.14	0.13	0.16	0.18	0.221	0.109	0.28-0.41	0.31	NV
Thallium mg/kg-dry	0.099 J	0.58	0.17	0.15	0.21	0.16	0.17	0.27	0.22	10.36-16.27	12.46	NV
Potassium mg/kg-dry	0.072 J	0.15	500	950	750	1100	1100	1550	878	NV	NV	NV
Vanadium mg/kg-dry	21	51	49	45	56	44	58	68.9	49.2	NV	NV	NV
Zinc mg/kg-dry	310	180	92	78	91	73	89	147	103	22.5-161.3	80.03	53

Notes:
Detections are in bold.
Shaded rows indicate analyte results that are similar to background values.
NV - No Value
J - The associated numerical value is an estimate.
U - The analyte was not detected above the reported sample quantitation limit.
UJ - The analyte was not detected above the reported, estimated sample quantitation limit.

Background Sediment Values:
LCR Rec - Lower Columbia River Reconnaissance Survey of the Lower Columbia River. 1993
Values used were from LCR river segment 4; river mile 105 - 146. Bonneville Dam is located at river mile 146.
DEQ - October 28, 2002, Memo from Toxicology Workgroup, Subject: Default Background Concentrations for Metals.

TABLE 4-2
ANALYTICAL DATA SUMMARY
SEDIMENT DETECTIONS
COLUMBIA RIVER NEAR BRADFORD ISLAND

Analytes	Former Debris Piles	Drain Outfalls
Polychlorinated Biphenyls (PCBs)		
Aroclor 1254	X	
Aroclor 1260		X
Pesticides		
4,4'-DDD	X	
4,4'-DDE	X	
4,4'-DDT	X	
Semivolatile Organic Compounds (SVOCs)		
3- & 4-Methylphenol		X
bis(2-Ethylhexyl)phthalate		X
Carbazole		X
Dibenzofuran		X
Polycyclic Aromatic Hydrocarbons (PAHs)		
Acenaphthene		X
Anthracene	X	X
Benzo(a)anthracene	X	X
Benzo(a)pyrene	X	X
Benzo(b)fluoranthene	X	X
Benzo(g,h,i)perylene	X	X
Benzo(k)fluoranthene		X
Chrysene	X	X
Dibenz(a,h)anthracene		X
Fluoranthene	X	X
Fluorene		X
Indeno(1,2,3-cd)pyrene	X	X
Naphthalene		X
Phenanthrene	X	X
Pyrene	X	X
Metals		
Aluminum	X	X
Antimony		X
Arsenic	X	X
Barium	X	X
Beryllium	X	X
Cadmium	X	X
Calcium	X	X
Chromium	X	X
Cobalt	X	X
Copper	X	X
Iron	X	X
Lead	X	X
Magnesium	X	X
Manganese	X	X
Mercury	X	X
Nickel	X	X
Selenium	X	X
Silver	X	X
Thallium	X	X
Potassium	X	X
Vanadium	X	X
Zinc	X	X
Total Petroleum Hydrocarbons (TPH)		
NWTPH-Dx		
Motor Oil		X
Butyltins		
Dibutyltin	NA	X
Monobutyltin	NA	X
Tributyltin	NA	X

Note:

An "X" denotes the analyte was detected at the location.
An "NA" denotes the analyte was not analyzed for at the location.
Highlighted cells denote analytes that will not be analyzed for during this investigation. See text for discussion.

TABLE 5-1
Data Quality Objectives
Bradford Island
Post-Removal Sampling

Sample Group	Sample Type	Description	Rationale	No. Surface Samples (0-6")	No. Subsurface Samples (6-18")	Sample Analysis
Source Area Sampling						
1	Temporal	Collect samples in Pile #1 and #2 in locations that were previously sampled and exhibited high PCB concentrations.	Assist in the determination whether temporal changes in sediment contamination exist.	4	0	PCB Aroclors by EPA Method 8082, total organic carbon by EPA Method 9060, grain size by ASTM D422
2	Grid	Collect unbiased samples in tight grid in area encompassing former debris pile areas and drain outfall area.	The grid will allow an unbiased coverage over the source areas for use in the nature and extent as well as the risk assessment. Since deposition may occur over a portion of this area, subsurface samples will be attempted at select locations.	36	8	Full analytical suite*
3	Transect	Collect samples from 14 transects extending from two of the three former debris piles and catch basin outfall area.	The transects are placed up and down current, (depending on the flow condition) and are outside the grid to determine if the area surrounding the identified sources is impacted. Since deposition may occur along some transects, subsurface samples will be attempted at select locations.	16	6	Full analytical suite*
Potential Depositional Sampling						
4	Depositional	Collect samples in areas where the USACE hydraulic model predicts low relative bottom velocity. The hydraulic model is based on a variety of flow conditions.	Sediment may have been transported from the source areas and deposited in areas that have low relative velocity under several flow conditions. Deposition may have occurred over a period of time; therefore subsurface sampling will be attempted at each location to assist in vertical extent characterization.	13	13	Full analytical suite*

TABLE 5-1
Data Quality Objectives
Bradford Island
Post-Removal Sampling

Sample Group	Sample Type	Description	Rationale	No. Surface Samples (0-6")	No. Subsurface Samples (6-18")	Sample Analysis
5	Southeast Side of Bradford Island	Attempt to collect samples along the southeast shore of Bradford Island. One sample exhibiting fine-grained sediment will be chosen for analysis.	PCBs in sediment have been found on south side of Bradford Island. Sampling will be attempted between Pile #1 and the previous detection on the south side. The sample that exhibits the finest-grain will be submitted to help in the understanding of transport mechanisms in this area.	1	1	Full analytical suite*
Goose Island						
6	Goose Island	Collect samples in water near the shore of Goose Island and upland on Goose Island.	High concentrations of PCBs in crayfish tissue were found near Goose Island. Goose Island may be a source of contamination, or may be impacted by debris pile contamination.	5**	3**	Full analytical suite*
Other						
7	Fish ladder disposal piles	Collect samples of sediment removed from the east lateral of the Bradford Island fish ladder.	Results will determine whether contaminated sediment collects in the fish ladder.	1	0	Full analytical suite*
Reference Sampling						
8	Reference	Collect samples upstream of the site in location not impacted by Bradford Island contaminant sources.	Results will establish background/ambient concentrations. Results will be compared to site sample results.	2	0	Full analytical suite*
Risk Assessment Sampling						
9	Bioavailability analysis	Analyze samples that exhibit fine-grained characteristics in both source and depositional areas.	Results will assist in determining bioavailability of contaminants to potential receptors.	10	0	AVS/SEM by EPA Draft 1991, pH by EPA 9045C, Moisture content by ASTM D2216-90

TABLE 5-1
Data Quality Objectives
Bradford Island
Post-Removal Sampling

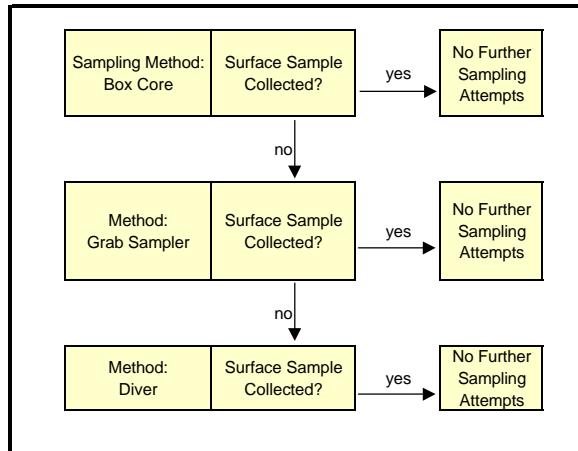
Sample Group	Sample Type	Description	Rationale	No. Surface Samples (0-6")	No. Subsurface Samples (6-18")	Sample Analysis
10	Water column	Collect water samples at locations that exhibit fine grained sediment characteristics	Results will be used to establish the ability of chemicals in the sediment to transport to surface water and availability of sediment based contaminants to potential receptors.	10	0	Total suspended solids by EPA 160.2, dissolved organic carbon by EPA 415.1, hardness by EPA 130.2, pH by EPA 150.1

- The full suite of parameters is: PCB-Aroclors by EPA Method 8082, metals by EPA Method 6000/7000, semivolatiles by EPA Method 8270C, pesticides by EPA Method 8081A, butyltins by the PSEP Method, diesel and heavy oil range organics by NWT PH-Dx, total organic carbon by EPA Method 9060, and grain size by ASTM-D422.

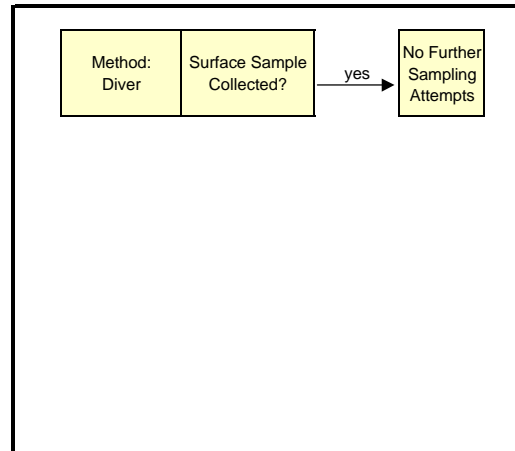
**Six of the samples are sediment samples collected near the shore of Goose Island. Two of the samples are soil samples collected upland on Goose Island at 6 inches below ground surface.

Table 5-2
Sampling Method Flowchart
Bradford Island
Post-Removal Sampling

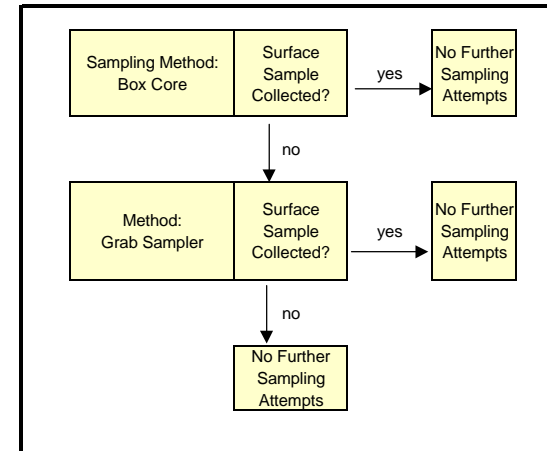
Source Area Samples: West End of Source Area Through Pile #3¹



Source Area Samples: East of Pile #3 Through Pile #1²



Depositional Area Samples



¹Grid, and Transect Samples

²Temporal, Grid, and Transect Sample Groups

Each sampling method will be attempted three times before attempting a different sampling method.

Subsurface sample collection will be attempted with a box core sampling device. If a subsurface sample is not retrieved with the box core, a subsurface sample will not be collected.

TABLE 7-1
Subcontractors and Services

Subcontractor	Service	Address and Contact
Contract Laboratory – To be determined		
David Evans and Associates, Inc. ¹	Surveying	2828 SW Corbett Avenue Portland, OR 97201 Contact: Joanna Hawkins (503) 223-6663
Advanced American Diving ¹	Diving	415 S. McLoughlin Blvd. Oregon City, OR 97045 Contact: Mike Johns (503) 650-8207

¹These companies have not been contracted. It is anticipated that these companies will be contracted due to extensive previous site experience and site knowledge.

TABLE 8-1
Project Schedule

ACTION	ACTION BY	ESTIMATED DATE
Submit Draft Mangement Plans to the USACE	URS	Thursday, December 05, 2002
Submit Comments on Draft Plans	USACE/Agencies	Thursday, December 19, 2002
Issue Final Management Plans	URS	Thursday, January 09, 2003
Issue Notice to Proceed	USACE	Wednesday, February 19, 2003
Complete Field Work	URS	Tuesday, March 18, 2003
Submit Draft Report	URS	Thursday, June 19, 2003
Submit Comments on Draft Report	USACE/Agencies	Thursday, July 10, 2003
Submit Final Report	URS	Monday, July 28, 2003